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ILLUSTRATED BY ANATOMICAL PREPARATIONS.

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## SUPRAPUBIC CYSTOTOMY.

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The revival of suprapubic cystotomy awakes great interest among surgeons throughout the civilized world. In former years the high operation was reserved for large calculi which could not be removed by any of the perineal operations. The rate of mortality was so high that the operation was considered justifiable only in extreme cases. At the present time, through the influence of the writings and demonstrations of Garson and Petersen, suprapubic cystotomy has become a recognized operation for the removal of calculi of all sizes, and of all descriptions, and under all conditions.

In addition to the removal of stone, the high operation has opened up a new field to the practical surgeon. Vesical tumors and ruptures of the bladder are now operated upon where heretofore no operation was performed. This great change in operative procedure has been brought about by anatomical

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demonstrations and by experimental work upon the cadaver. The results of these experiments have proved the safety of exploration of the bladder by the *sectio alta*. It is interesting to observe in this connection the different stages through which the operation has passed, from the earliest recorded dates down to the present time.

In studying the history of the operation in chronological order, one is forcibly impressed with the fact that the present complete and perfect method of performing epicystotomy is not due to the entire work of any individual. The operation as it is now performed, according to the technique recommended by Garson and Petersen, has been the result of a gradual growth and steady development. The work of the anatomist has been supplemented by the surgeon. Practical applications have been made of knowledge obtained by experimental work. Suprapubic cystotomy of the present century differs from the suprapubic cystotomy of the sixteenth century only in the perfection and completion of the details. The same general principles were formerly recognized, as I shall endeavor to point out, and it has been through the improvement of these different methods that the present complete operation has been perfected. In other words, improvements in the technique, rather than the introduction of any new principle, have given us this eminently satisfactory operation. I shall endeavor to prove that the suprapubic operation of to-day owes its parentage to the original operation.

In reading the early description of this operation, it is obvious that the great dangers were fully recognized, but the exact way in which to avert these dangers was not understood. The prevention of injury to the peritoneum and the avoidance of urinary in-

filtration were aimed at in the early operation, but the means to bring about immunity from these special dangers were crude and undeveloped. In the modern high operation the peritoneum is protected and urinary infiltration avoided by forcing the bladder upward by compressed distention of the rectum and bladder. The additional safeguard to the danger of urinary infiltration is offered by the employment of an antiseptic fluid for distending the bladder, instead of ordinary fluid. The principle of lifting the bladder upward was crudely demonstrated by the surgeon introducing his finger into the rectum and pushing up the bladder. The distention of the bladder was made by injecting fluid into the vagina. Huguier, in the seventeenth century, recommended the use of the finger in the rectum for the purpose of lifting up the bladder. The accomplishment of this object is now secured by the use of the catheter in the rectum and by the injection of an antiseptic fluid into the bladder. Desault, Cheselden, and other surgeons practised a certain amount of forced distention. The principle recognized in the old and the new operations is identical, but the means employed to carry out the principle are widely different. Our operations have handed down to us a principle in the high operation which every fully recognized, and which they tried to carry into practice. They were unable to meet practically all the emergencies of the case. Our contemporaries have beautifully perfected and carried into execution the same principle by a method which to-day enables the surgeon to operate with comparative ease and safety.

A brief historical sketch of the suprapubic operation is pertinent, in order to appreciate the important changes through which the operation has passed. There is no authentic description of the suprapubic

method until it was performed by Pierre Franco in the year 1561. Franco performed the operation upon a boy, but did not commend it to the profession. Rousset, in 1581, wrote a careful description of the operation, and highly commended it to the profession. Rousset's paper deals with the operation from a theoretical point of view, and King Henry VIII. promised him several criminals for experimental work in order to demonstrate the operation in a practical way. The king died, and Rousset was unable to prove the value of his suggestion by any demonstration upon the live human body. The operation now fell into disuse until 1635, when Mercier advocated it in a thesis before the Faculty of Medicine in Paris. Bonnet performed the operation with success in 1681 at the Hotel Dieu. Proby, in 1694, explored the bladder by the high operation for the removal either of a calculus or a foreign body. Historians do not agree in their accounts as to the object of the operation. Such is the brief historical sketch of this formidable operation until John Douglas, of London, reported four successful cases in 1723. Cheselden, in this same year, published a paper upon the operation, and afterward became its great champion. In 1727 Douglas had performed the operation nine times, with but one death; and Cheselden six times, with but one death. Thornhill had twelve cases, and only two of them died. McGill had five cases.

At this epoch, when the results were comparatively brilliant, the introduction of the infrapubic operation caused the suprapubic operation to fall into disrepute; not on account of its failures, but owing to the great *éclat* with which the perineal operations were received. Cheselden improved and developed the perineal method of the

monk Friar Jacques, who began his operations in 1695, and of Haen, the Holland surgeon, and Cressiden then became the champion of the perineal operation, as he had been of the high operation. The suprapubic method was but little pursued until Friar Comes revived the operation, and in 1779 published a description of his own method of performing suprapubic lithotomy. He made an opening in the membranous portion of the urethra, through the perineum (transurethra), for the purpose of introducing a sound with a *stylet bougé à crochets* in order to pierce the bladder just behind the symphysis pubis.

Since the time of Friar Comes the suprapubic operation has been seldom employed, until the introduction and practical application of Gossow's and Poirson's experiments. From its earliest history in 1651 Gossow could only collect six cases. From 1650 to 1879 there were but few cases reported. From 1879 to the present time the suprapubic operation has been performed by many surgeons, and with such uniform success as to attract the undivided attention of surgeons throughout the civilized world. Reports of the brilliant success which has attended this modified suprapubic operation come pouring in from every land, and the time has now arrived when the shackles which have hitherto trammelled this operation shall be thrown aside and the results critically examined in an impartial and honest spirit.

The prophetic words of Dr. Roberts, uttered at a former meeting of this distinguished Association, in which he stated "that within ten years the suprapubic operation will be the operation adopted for all cases of stone that are not treated by Hugelow's operation," are now almost realized. I would ven-



ture to remark that the time is not far distant when there will be but practically two operations for stone in the bladder, the suprapubic lithotomy and litholapaxy. If future experience demonstrates that a return of calculus occurs in a fair percentage of the cases after lithotomy from debris left behind, and that the mortality of the suprapubic is reduced to a figure equal to or less than perineal lithotomy, then suprapubic lithotomy, with its special advantages, will be the recognized operation of the day. If it can be shown that the mortality in the suprapubic operation is due in great part to causes which may be prevented in the course of anti-septic surgery, there is no doubt as to the future of the operation. It is simple in its technique, safe in its execution, radical in its results, free from injury to the reproductive organs, curative in its application, and finally brilliant in its statistics. With all these advantages time will soon determine the place which this operation is destined to take among the recognized surgical operations. On the other hand, the many and serious accidents which follow the lateral operation are avoided.

The technique of the operation of opening the bladder by the suprapubic method is worthy of consideration. A few days previous to the operation the patient can be put upon a milk diet, and the day previous to the operation the bowels should be freely moved by a dose of castor oil, and the morning of the operation an enema should be given, so as to empty the rectum for the introduction of the rubber bag. The hair should be shaved from the pubes and the parts should be thoroughly washed and scrubbed and irrigated with a solution of bichloride of mercury or carbolic acid. This ablution should be repeated at the time of the operation.



The patient being fully under the influence of ether is prepared for the operation. The surgeon should first introduce the India rubber bag into the rectum. The bag should be cooled and should be carried well up the rectum so as to be above the constricted sphincter. Into the rubber bag are injected, slowly, twelve ounces of warm water, at least I would recommend this quantity as the standard, and from it the amount can be slightly increased or diminished according to individual circumstances. Instead of water, air can be used to inflate the bag, as suggested first by Meibom in 1772, at Leipzig; but the water for obvious reasons is preferable. If the patient is a boy, instead of an adult, less than twelve ounces of warm water need be injected. The surgeon should bear in mind the danger in respect of the rectum, especially in elderly people and young boys, and exercise judgment in regard to the proper quantity of water to be injected in any given case. Several instances have followed the careless use of the rubber bag during distention of the rectum. In one case, where catheter attempts were made, the rectum was lacerated.

The next step in the preparation of the patient concerns the suprapubic operation to the distention of the bladder. Here again the surgeon must be very cautious lest he injure the great quantity of bowel. A silver catheter should be passed and all the urine drawn, and then into the empty bladder about half the quantity of water should be carefully injected that was used to distend the rectum. The quantity should be about six ounces, at least this amount might be taken as a safe standard and variations made according to individual circumstances. The liquid should be antiseptic, and the best is Thiersch's solution, which contains boric acid, the

acid. The solution should be slowly injected and the surgeon should notice the ascent of the bladder above the pubes. He should also observe the amount of resistance offered to his hand during the distention of the bladder. The same caution here is advised as during the dilatation of the rectum; because any undue force might rupture the bladder, as has happened in several experiments. An India-rubber tubing can be passed around the penis after the catheter has been removed to prevent the escape of the antiseptic fluid which has just been injected for the purpose of distending the bladder. If the assistant's finger is placed over the open mouth of the silver catheter, or, better, a small plug into the end of the catheter, the escape of the fluid will be prevented, and the silver catheter will also serve as a guide to cut upon when the bladder is exposed. This use of the catheter avoids the necessity of withdrawing the instrument and of reintroducing another into the bladder to serve as a guide to cut upon after the viscus is exposed in the wound. The distention of the bladder after dilatation of the rectum increases the distance nearly three inches between the symphysis pubis and the anterior cul-de-sac or pubo-vesical fold of the peritoneum. The membranous and prostatic portions of the urethra are stretched, as has been shown by Sir Henry Thompson.

The patient being placed upon his back with his pelvis elevated so as to cause the abdominal viscera to gravitate toward the diaphragm, is now ready for the operation. The surgeon stands on the left side of the patient and makes an incision three to four inches in length from below, beginning at the pubes and extending upward exactly in the median line of the body. The skin, fasciæ, and cellular tissue having been divided, the linea alba is now exposed.

The surgeon cuts along the raphe upon a grooved director between the pyramidalis and recti muscles, dividing also the transversalis fascia. It sometimes happens that the pyramidalis muscle is exposed by cutting the sheath of the rectus instead of going exactly through the linea alba, and the operator must remember that there is no posterior sheath to the pyramidalis but only the transversalis fascia. The fascia must now be carefully divided and the surgeon next exposes a small space filled with fat and loose connective tissue. Before disturbing this tissue a retractor can be placed in the wound, and this retractor, which is made like an eye speculum, holds the edges of the wound apart and enables the surgeon to command a good view of the parts and to work with greater facility. The use of the retractor suggested itself to me by its employment in the operation for trachotomay, where I have found the eye speculum of great help in holding open the wound while making the deep incisions to enter to open the trachea.

The finger of the surgeon should now be introduced into the wound where he can feel the distended bladder. The loose connective and fatty tissue overlying the bladder should be carefully separated with the handle of the scalpel, then the upper surface of the bladder is brought fully into view with its veins and muscular fasciculi showing on its surface. The surgeon should carefully avoid tearing up the cellular connective tissue between the pubes and the neck of the bladder, as this might afford an opportunity for urinary infiltration. The point of the silver catheter can be felt within the bladder upon its anterior wall, and this can be relied upon as a guide.

It may now safely exist as to whether the per-

toneum is out of danger, the surgeon should examine to see if there are two sliding surfaces lying over the beak of the catheter, and if there is a distinct transverse raphe over the summit of the bladder. If only the wall of the bladder is present the surgeon can seize the viscus with two delicate tenacula, and having observed that all hemorrhage and oozing have ceased, open the bladder between the two tenacula and over the point of the catheter.

The walls of the bladder, especially the mucous membrane, are often very much hypertrophied, as a result of the irritation from the stone. The small opening in the bladder is now enlarged by a probe-pointed bistoury in the direction downward toward the symphysis pubis; but never below toward the neck of the bladder and urethra. This last incision would be fraught with great danger. If the object of the operation is the removal of a tumor requiring a free exposure of the interior of the bladder, a stitch is taken in the bladder wall on each side of the incision, and the wound held apart by the suture. The threads also prevent the dipping down of the bladder after the fluid has escaped. The index finger, first dipped into a warm antiseptic solution, is now carried into the bladder and the stone felt, and with the assistance of the other index finger carefully lifted out of the bladder. Instead of the fingers the lithotomy forceps can be employed. If the stone is very large it can be crushed before removal. If there is any difficulty in seizing and removing the calculus, the rubber bag can be emptied and removed and the index finger of the assistant introduced into the rectum and the stone pushed upward so that the surgeon can easily grasp it.

The bladder can now be thoroughly washed out and a soft flexible rubber catheter introduced

through the urethra for perineal drainage. The catheter must be removed in forty-eight hours, or its presence will excite a traumatic urethritis. This complication occurred in a case last winter, in which I left the catheter in the bladder too long. An interesting clinical fact in connection with this case was the certainty of the diagnosis as to the traumatic and not specific origin of the discharge. Dr. Seymour Houghton, House Surgeon in Bellevue Hospital, examined very carefully the pus in the Carnegie laboratory, under the microscope for the presence of Neisser's gonococci. But the staining failed after many attempts to show the special germ of this disease. I have seen a boy of ten years and a girl of eight years and also a boy of six years, all affected with gonorrhea. The first two patients denied any knowledge as to the origin of the trouble, but when the gonococci were found and they were directly charged with it, they confessed. This complication of a traumatic urethritis serves as an important lesson to remind the surgeon not to leave the catheter in over two days. The catheter in this case was left in four or six days, but was aseptically clean. It was a desire to incur no risks of infiltration on account of the unusual size of the wound in the bladder that induced me to allow the catheter to remain longer than it was necessary.

In this connection might be mentioned the subject of perineal drainage after the suprapubic operation. Some surgeons provide drainage through the perineum by making an opening to the membranous portion of the urethra (the boutonniere) for the purpose of introducing a drainage tube into the bladder by this opening. This seems an unnecessary procedure, for the urethra with a rubber catheter introduced into it, will provide a natural drainage with-



out incurring all the risks incident to wounding the perineum and urethra. Such a procedure exposes the patient to an additional danger of urinary infiltration, and to the danger of the formation of a traumatic stricture and to hemorrhage; and possibly to additional danger of septic infection. The urethra is the natural channel through which to drain, and the opening above can also be used for antiseptic siphon drainage and irrigation, as suggested by Sir Joseph Lister. Hence the perineal incision is unnecessary; besides, it adds the mortality of the median operation to that of the suprapubic. The very object of the high operation is defeated when a perineal wound is made.

The patient should lie with his shoulders elevated, or upon his side, and in this way better drainage is thus secured. Trendelenburg recommends the abdominal position for drainage after the operation. When this is practical it is a most excellent method to establish perfect drainage.

Another question in the technique of the operation is the management of the wound in the bladder. Here an honest diversity of opinion exists among surgeons, and it is an important point for discussion in connection with the high operation. From a careful research into the meagre literature of the suprapubic operation in its modified form, and also from a limited practical experience, I feel convinced that the bladder wound in the majority of cases should be left open. If the bladder in an adult is sewed the wound is most likely to reopen on account of the pathological condition of the bladder wall and the mucous membrane. In chronic cystitis there is thickening of the bladder wall and alteration in the mucous membrane. A failure to secure primary union is quite likely, and

if the wound respects the dangers of infiltration of urine and septicæmia are greatly increased. In twenty-five cases collected by Schmitz with a view to throwing light upon this point six of the patients died, which gives a mortality of twenty-four per cent., and in only four cases did primary intention follow. If the wound in the bladder is stitched a natural provision for drainage is sacrificed, and on account of the unhealthy condition of the mucous membrane from a chronic cystitis accompanied by thickening of the entire bladder wall the wound is not likely to heal by primary intention. The wound opens and sloughs occur and the result is extremely unsatisfactory.

While condemning the practice of suturing the bladder wound after removal of a calculus, the same plan is not to be followed in certain other conditions. In rupture of the bladder, for example, the wound should be sewed, but here the conditions of the mucous membrane and the walls of the bladder are altogether different. Primary intention is more likely to be secured in such a case where it would be useless to try under other conditions. If the bladder wound after a high operation for stone is left open to heal by granulation, it will permit the surgeon to treat intelligently a chronic cystitis. The wound in the skin can be partially closed and a large rubber drainage tube introduced into the bladder. After a few days the urine will pass the natural way and any little overflow is cared for by the upper drainage tube.

In young children where suturing the bladder is likely to be followed by primary intention the difficulties of the operation are very great on account of the extreme thickness of the bladder wall and the small abdominal wound. An attempt to close the



vesical wound therefore prolongs the operation unnecessarily and should not be attempted unless the bladder is fairly healthy, and the patient is in good bodily condition at the time of the operation. Lembert's sutures in close apposition should be employed and the mucous coat must not be included. The bladder must be carefully manipulated during the sewing so as to prevent a cellulitis. After the wound is stitched an injection of an antiseptic fluid should be carefully made into the bladder to ascertain if there is any leakage. If the bladder is properly sewed no permanent drainage is indicated, but the soft catheter can be passed several times during the first twenty-four hours after the operation, and occasionally after the first day, so as to prevent any distention. The wound heals by primary intention and this occupies only a short time.

The abdominal wound is also closed and a small drainage tube is inserted into the lower angle of the wound. Von Bergmann sutures the bladder and packs the abdominal wound with iodoform gauze for forty-eight hours and thus prevents suppuration. He then closes the abdominal wound in two days after removing the gauze. Schmitz (*Langenbeck's Archiv*, vol. xxxiii., 1886) reports thirty cases of suture of the bladder in children with a mortality of nearly seven per cent. In the thirty cases of suture about half of these cases resulted in primary union of the wound. If children and adult cases are grouped it is estimated that in two-thirds of the cases the bladder wound reopens.

A few days after the operation the patient can sit up in bed and an uninterrupted and speedy recovery should take place. Prof. Annandale recommends the introduction of a lithotrite into the bladder in order to seize the stone and then to cut upon the

lithotrite as a guide and remove the stone. A rubber catheter is introduced into the blades of the lithotrite through the abdominal wound and the instrument withdrawn with the rubber catheter. The drainage through the pericœum and also in the wound above is the same as in the method already described.

The special indications for exploration of the bladder by the suprapubic method are found:

*First.* In cases of lithotomy for large hard calculi; also in lithotomy occurring in a patient suffering from paraplegia, a contracted pelvis, perineal tumour, enlarged prostate, ankylosis of the hip, hemorrhoids, or great obesity.

*Second.* For the removal of certain foreign bodies as harpins, broken needles, etc., for the treatment of chronic cystitis, and for the operation of calculi in the female.

*Third.* In lithotomy occurring in a patient with greatly enlarged prostate, or with fibrosis of the prostate, or in calculi found in diverticula behind the prostate.

*Fourth.* For the excision of cancers of the bladder.

*Fifth.* For rupture of the bladder.

The special advantages which the suprapubic operation offers may be enumerated as follows:

*First.* The safe removal of large hard stones which cannot be removed by any of the other methods.

*Second.* The avoidance of perineal hemorrhage, of urinary infiltration, of perineal fistula, of laceration of the rectum and neck of bladder, the prevention of traumatic stricture and cystic hemorrhage. The avoidance of any interference with the genital apparatus.

*Third.* The prevention of a vesico-vaginal fistula in young women, or of permanent incontinence of urine in aged women.

*Fourth.* The safest operation in all forms of renal disease, and the only means of saving life in rupture of bladder.

*Fifth.* The tendency of recurrence of stone is much less than by lithotrity.

*Sixth.* Its extreme simplicity, its present reduced rate of mortality, its freedom from danger during its execution, and its safety for the general practitioner in comparison with the perineal operations or lithotrity.

I have collected one hundred and twenty-four cases of the suprapubic operation for the removal of stone since 1879.<sup>1</sup> I have collated all the cases that I could find in medical journals and some cases which have as yet never been published. The influence of antiseptics, and of the rectal rubber-bag together with vesical distention, is apparent when the cases are carefully examined. The death-rate until 1879 was high, since it reached the average of about twenty-five to thirty per cent., but owing to the experiments of Garson and Petersen that mortality has been greatly reduced.

There are one hundred and twenty-four cases. There are, *in toto*, eighteen deaths. This gives a gross mortality of about fourteen per cent. Of these eighteen deaths, the following seven can be, with justice, eliminated from the list in estimating the rate of mortality:

1. Belfield. Corrosive sublimate poisoning.
2. Briggs. Patient was moribund at the time of the operation, and was suffering from suppression of urine

<sup>1</sup> The author has collected all the cases and placed them in an alphabetical table in which all the facts in connection with each case are given. Space will not permit the publication of the table in full, though it is one of great value, and will appear in full in the Transactions of the American Surgical Association.—EDITOR.]

before the operation. The operation was performed against the advice of the surgeon, and at the special request of the mother of the child. The conditions were necessarily fatal before any attempt was made to remove the stone.

3. Kuster. A median operation was first performed to extract a piece of catheter. He was unable to remove the foreign body, and then performed a suprapubic cystotomy.

4. Martin. Recovery from operation; but patient died three months afterward.

5. Robert. Recovery from operation. Patient had a gastric ulcer, and died two months after from perforation of the stomach.

6. Rivington. Recovery from operation. Patient died three months after from diarrhoea and a cystitis.

7. Ferris. Patient died from uræmia eight days after operation. Autopsy showed that the bladder was healthy—wound septic, and poorly healed.

There are eleven deaths, which can be directly ascribed to the operation itself. This gives one death in about eleven cases, or a mortality of about one per cent., for the removal of stone by suprapubic cystotomy.

The mortality in the lateral operation, according to Sir Henry Thompson, is about one in every eight cases, or, in other words, over twelve per cent.

I am aware of the fact that objections may be raised to taking Sir Henry Thompson's statistics on lateral lithotomy; because other surgeons have published better results. Their experience, however, is not so great, nor is their number so large. In Sir Henry Thompson's cases lateral lithotomy was reserved for cases unsuitable for crushing. I will quote the statistics of other surgeons before any comparison is made.

I never reports one hundred and forty-three cases,

without a death. Zelt reports one hundred and six cases, with three deaths, or a rate of mortality less than three per cent. Werewkin reports one hundred and forty-seven cases, with a mortality of six per cent. Heninger reports two hundred and twenty-two cases, with a mortality of nearly seven per cent. Ebermann reports a mortality of fourteen per cent. Skinnisen reports one hundred and fifty-four cases, with seven deaths, or a rate of mortality of about four and a half per cent.

This great difference in the mortality of the lateral operation affords room for much conjecture as to its cause.

In lithotrity Sir Henry Thompson's last statistics show a death-rate of about six per cent. The Norwich Hospital records show a death-rate of over ten per cent.

In litholapaxy Dr. Freyer reports one hundred and eight cases, with a death-rate of nearly four per cent.; Keegan fifty-eight cases, with two deaths, or a rate of mortality of about three and a half per cent. Gross collected one hundred and eighty cases, with four deaths, or a rate of mortality of about three per cent.

The rate of mortality for the suprapubic operation performed with its recent modifications compares favorably with perineal lithotomy, and also with litholapaxy, when the stone is over an ounce. In addition to a favorable comparison, in regard to the rate of mortality in litholapaxy in large stones, the important question of recurrence of calculi must not be forgotten. After crushing the recurrence is estimated at one in seven cases, while after lithotomy, one in twenty-five cases. This fact is one of very great importance in estimating the relative value of the two operations in any given case.

Still another very important point to consider, as to the superiority of the suprapubic operation, is the question of sterilization. Langenbeck, as a result of his own experience, believes that after the suprapubic ducts are cut and sterility follows. Halberstadt reports eighteen lateral lithotomies in which the patients, after having grown up, married, and only one out of these eighteen cases had issue.

If reliable statistics could be obtained on this point there is no doubt this one fact alone would weigh very strongly against the perineal operation. The successful rate of a series of lateral operations is brilliant, and—how wonderful!—all in the part of the operator. The history of a patient should be examined years afterward in order to estimate the value of the operation from other points than its mere mortality. Dr. Charles Leake, whose experience has been very great in collecting evidence upon this point, related to me several cases under his own observation where sterility has been the result of the lateral operation. These patients had little or no hair upon the legs, their voices were shrill, their testicles were atrophied, and they were, in fact, eunuchs. I doubt not but many medical men can narrate similar cases. I do not wish to exaggerate the importance of this subject, but simply to call attention to the point as a subject for further examination in the way of collecting case histories.

The most important point of the value of the suprapubic method lies in the fact that heretofore the suprapubic method has been reserved for the removal of calculi above the average size where all other operations were inadvisable. If now the suprapubic operation with its recent modifications is resorted to in those cases where the perineal operation only is employed the results will be far more brilliant. These



facts demonstrate that the suprapubic operation, as now performed, is a far more successful operation than has been supposed from a reference to its early statistics. It will not, however, supplant litholapaxy in cases of small and soft calculi; but in large stones its results already are far more favorable than perineal lithotomy. The limitations of lateral lithotomy are narrowed by the introduction of the high operation, and future experience will, in all probability, limit the cutting operation for stone through the perineum to those cases where a tight stricture of the urethra exists, and where the operation of external perineal urethrotomy is indicated for the purpose of relieving the urethral stricture.

In conclusion, it may be said that suprapubic cystotomy, in its present form, presents to the practical surgeon a safe, reliable, and radical operation. It should be remembered, however, that the newly modified suprapubic operation has not been sufficiently submitted to the crucial test of time and experience to enable surgeons to estimate accurately its value under all conditions. Hence the great danger of generalization at present. Enough has been done already to convince the most incredulous that in the removal of large stones, and in tumors of the bladder, there is no question as to the superiority of the suprapubic operation.

The revival of this high operation, and its application in cases of traumatism of the bladder, have shown that surgical intervention can save human life where, but a few years ago, these cases were considered fatal. No one can dispute that the two recent cases of Sir William MacCormac bear brilliant testimony to this statement.

Finally, the rate of mortality by the suprapubic operation of about nine per cent. is high for a sur-



fied operation; but a low rate of mortality for an operation performed under the conditions in which this method has been employed. In considering this mortality two facts must be remembered:

*First.* The causes of death in the majority of the cases are due to septic infection, and not to the immediate effects of the operation itself. The employment of more rigid antiseptic for the bladder should improve this rate of mortality. At the present time there is no ideal antiseptic especially and peculiarly adapted to urological surgery. The attention of the Association should be directed to this important point.

*Second.* The largest and hardest stones have been removed for the high operation. The patients have been, as a rule, in poor physical condition. Improvements in the details of bladder anæsthesia and extension of the limits of the high operation to include tumors of smaller size, but not to embrace those suitable for lithotripsy, and an earlier period of operation before patients are exhausted from chronic vesical irritation will reduce the rate of mortality so as to compare favorably with any other curing operation for stone.





